Remarks

Claims 1 through 5 and 7 through 17 remain pending in the application. Claim 6 is canceled. Claims 1, 7, 11 and 14 are amended. A new paragraph is inserted at page 4, line 18 of the specification as originally filed. The specification is also amended to correct a typographical error at page 11, line 30.

The Office Action objects to the specification for failing to provide proper antecedent basis for the claimed subject matter. A new paragraph is inserted at page 4, line 18 to clarify the term "computer readable medium." Support for this amendment can be found in the audio encoder 100 of Fig 1 as originally filed for carrying out the method of transforming an audio signal, as well as in the image encoder 603 of Fig. 6 for carrying out the method of transforming an image signal. No new matter is added.

The Office Action rejects Claims 1 through 6 and 14 through 16 as directed to non-statutory subject matter under the assertion that Claims 1 through 6, 15 and 16 detail the steps of transforming a digital signal without structurally tying the steps to another statutory class (such as a particular apparatus). The Office Action further asserts that Claim 14 is directed to non-statutory subject matter as directed to software per se. Claim 1 is amended to define that the digital signal is an audio signal, an image signal or a video signal. Support for this amendment can be found at page 15, lines 24 to 27 of the original specification. Claim 1 is further amended to define a method carried out by an audio, image or video processing device. Support for this amendment can be found in the encoder

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100 of Fig. 1 for carrying out the method of transforming an audio signal, as well as in the image encoder 603 of Fig. 6 for carrying out the method of transforming an image signal. Claim 14 is amended similarly to define the digital signal, and is supported for the same reasons as argued above.

Claim 1 is amended to define that the digital signal is an audio signal, and image signal or a video signal. Accordingly, the method of Claim 1 is to process a digital signal representing physical objects, such as sound waves or physical objects captured in an image, in particular, to transform the digital signal representing physical objects to a different state (e.g. to a frequency domain) for further coding purposes. Therefore, the subject matter of amended Claim 1 satisfies one prong of the machine-or-transformation test. In addition, Claim 1 is amended to define a method carried out by an audio, image or video processing device. This amendment ties Claim 1 to a particular machine, an audio, image or video processing device, and the subject matter of the amended claims may be considered statutory subject matter. Accordingly, the Applicant respectfully requests withdrawal under 35 U.S.C. §101.

With regard to claim 14, the computer readable medium records a program adapted to make a computer perform a method for transforming a digital signal representing physical objects, as argued above. The computer readable medium is not software per se and therefore amended claim 14 is directed to appropriate subject matter. Therefore, claimed inventions in the claims as amended produce tangible results, and the subject matter of the amended claims may be considered statutory subject matter. Accordingly, the Applicant respectfully requests withdrawal under 35 U.S.C. §101.

The Office Action rejects Claims 1 through 9 and 14 through 17 as anticipated by Geiger, et al., Audio Coding Bases on Integer Transform, Audio Engineering Society Convention Paper, 5471 (Sep. 2001) under the assertion that Geiger discloses a process for transforming a digital signal from the time domain into the frequency domain and vice versa using a transformation function including a transformation matrix, the digital signal having data symbols that are grouped into a plurality of block, each having a predefined number of the data symbols, the method including: transforming two blocks of the digital signal by one transforming element, where the transforming element corresponds to a block-diagonal matrix having two sub-matrices, where each sub-matrix includes the transformation matrix and the transforming element has a plurality of lifting stages and where each lifting stage includes the processing of blocks of the digital signal by an auxiliary transformation and by a rounding unit.

Claim 1 is amended to further distinguish from Geiger. The cited reference does not disclose all limitations of the claimed invention. Geiger does not disclose that one or more of the lifting steps comprises the transformation matrix. In Sections "DCT-IV by Givens rotations," "the lifting scheme," and "the integer modified discrete cosine transform," Geiger discloses an integer transform method including a plurality of Givens rotations and replacing each Givens rotation with three lifting steps. For example, as illustrated at the bottom of the left column on page 4 of Geiger, each lifting step comprises a value related to $\sin \alpha$ or $\cos \alpha$, but does not comprise the transformation matrix of DCT-IV used in Geiger.

Instead Applicant's amended process claims a method for transforming a digital signal from the time domain into the frequency domain and vice versa using a transformation function comprising a transformation matrix. Two blocks of the digital signal are transformed by one transforming element, where in the transforming element corresponds to a block-diagonal matrix comprising two sub-matrices, wherein each sub-matrix comprises the transformation matrix. The transforming element comprises a plurality of lifting stages and each lifting stage comprises the processing of blocks of the digital signal by an auxiliary transformation and by a rounding unit, and one or more of the lifting stages comprises the transformation matrix. Geiger does not disclose that the lifting stages comprises the transformation matrix. As such, because the lifting stages do not comprise the transformation matrix, Geiger does not anticipate the amended claimed invention.

Claims 2 through 5, 15 and 16 depend from Claim 1 and for the reasons discussed above, Geiger does anticipate these claims.

The Office Action rejects claims 7 through 9, 14 and 17 under a similar rational as to claims 1 through 6, 15 and 16. For the reasons discussed above, Geiger does anticipate these claims.

The Office Action rejects Claims 10 through 13 obvious over Geiger under the assertion that Geiger discloses the features of independent claim 1 as discussed above and the addition of a transformation unit would have been obvious to a person having skill in the art.

There is no motivation to make the modify <u>Geiger</u> as suggested. As argued above, <u>Geiger</u> does not disclose that one or more of the lifting stages comprises the transformation matrix.

In addition, the transformation method of <u>Geiger</u> decomposes into Givens rotations. This typically leads to a large number of Givens rotations, each of which includes three lifting steps. Because each lifting step includes a rounding operation, the total number of rounding operations in the transformation method is large and the approximation error caused by the rounding operations is accordingly high. In contrast, the transformation method of Applicant's amended claim transforms two blocks of input data concurrently and uses the transformation matrix in one or more of the lifting stages, which helps to reduce the required number of lifting stages. Accordingly, the total number of rounding operations and the approximation error caused by the rounding operations are reduced by the transformation method of amended Claim 1. <u>Geiger</u> is only concerned with providing an integer transform method and does not mention any concern regarding reducing the number of lifting stages or rounding operations and therefore a person skilled in the art would not be motivated to modify the lifting steps of <u>Geiger</u> as suggested. Thus, there is no motivation to modify <u>Geiger</u> as suggested and the amended claims are not obvious in light of <u>Geiger</u>.

Conclusion

This response has addressed all of the Examiner's grounds for rejection. The rejections based on prior art have been

traversed. Reconsideration of the rejections and allowance of
the claims is requested.

Date: August 18, 2011   By: /Niky Economy Syrengelas/
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